

EIC / fsPHENIX MAGNET SIMULATIONS USING COMSOL

3/10/15 UPDATE

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Original BaBar Magnet

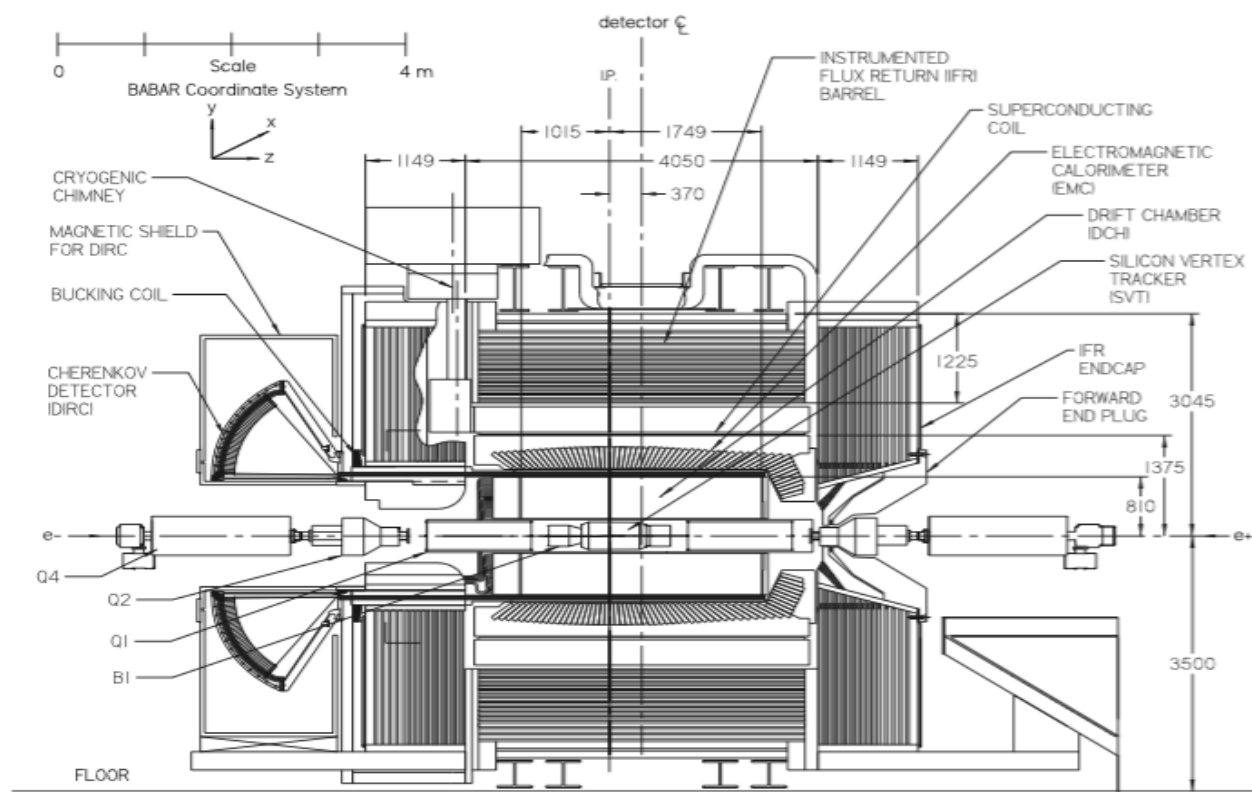


Fig. 1. BaBar detector longitudinal section [1].

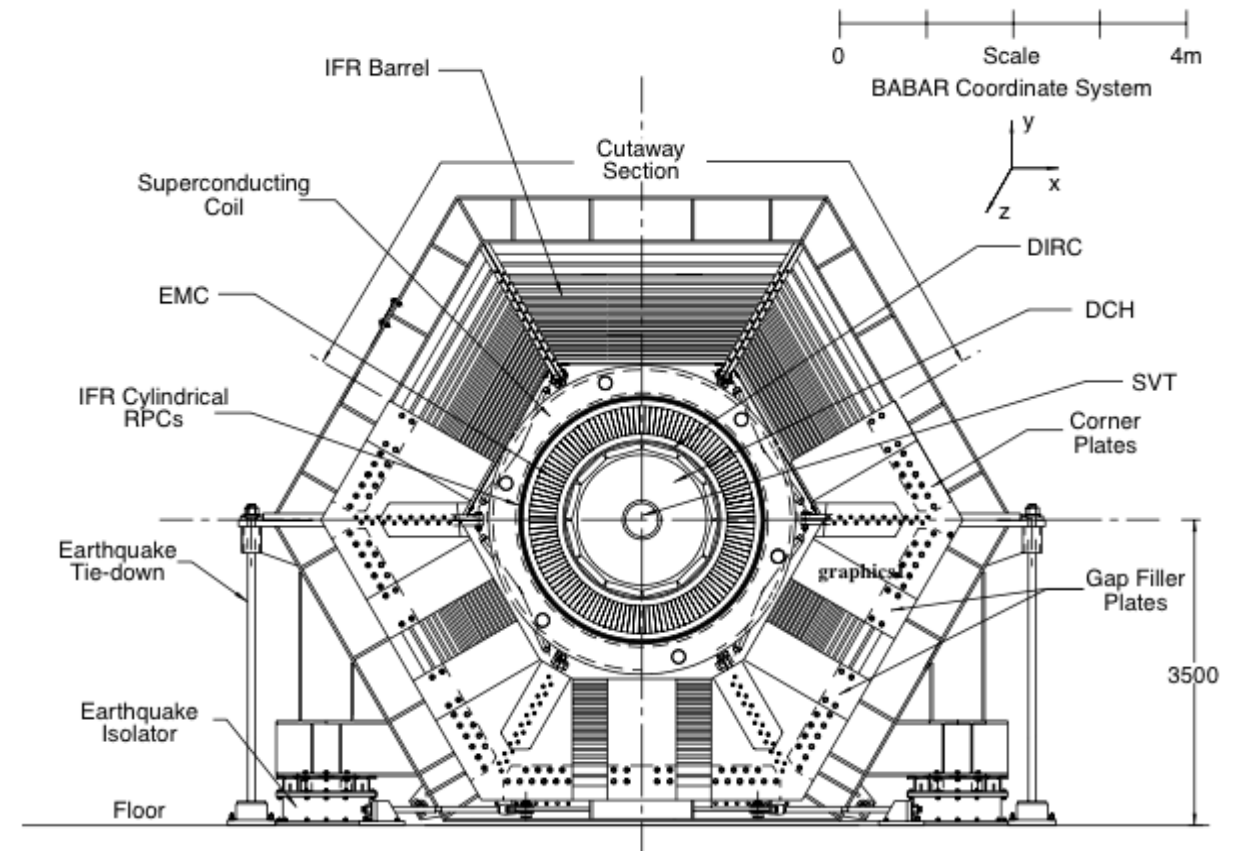
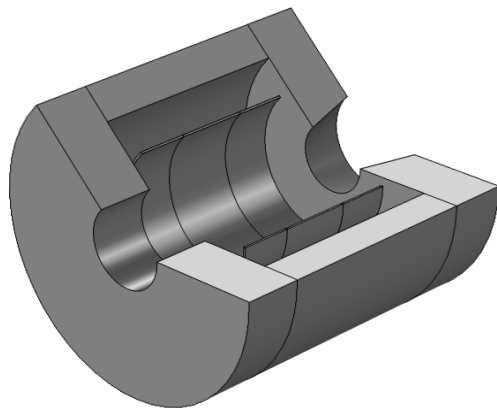
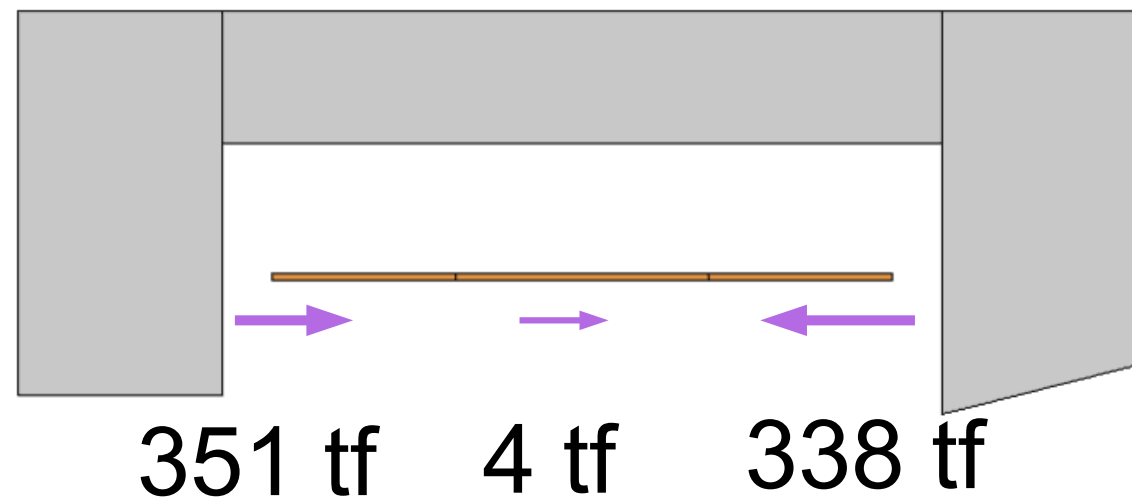


Fig. 2. BABAR detector end view.



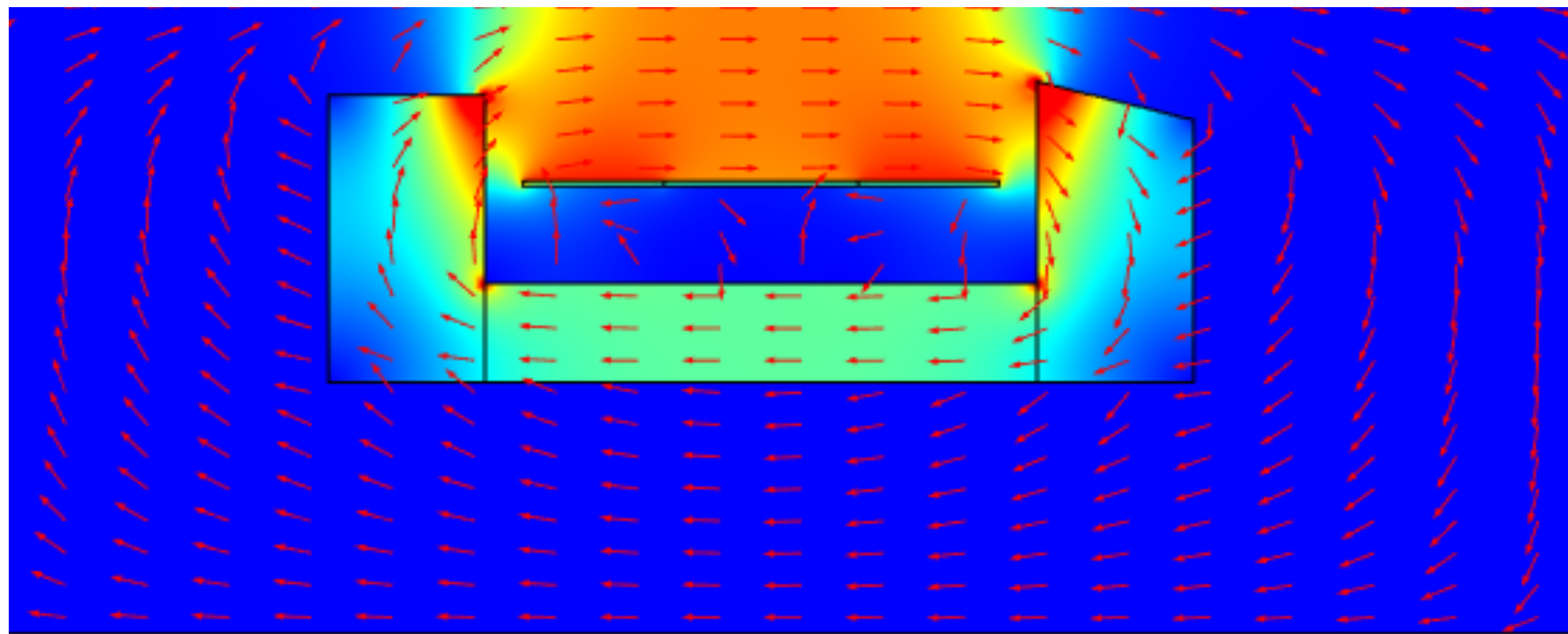
Model has been simplified in COMSOL (cylindrical instead of hexagonal) to obtain a first view of field maps.

BaBar Magnetic field in COMSOL

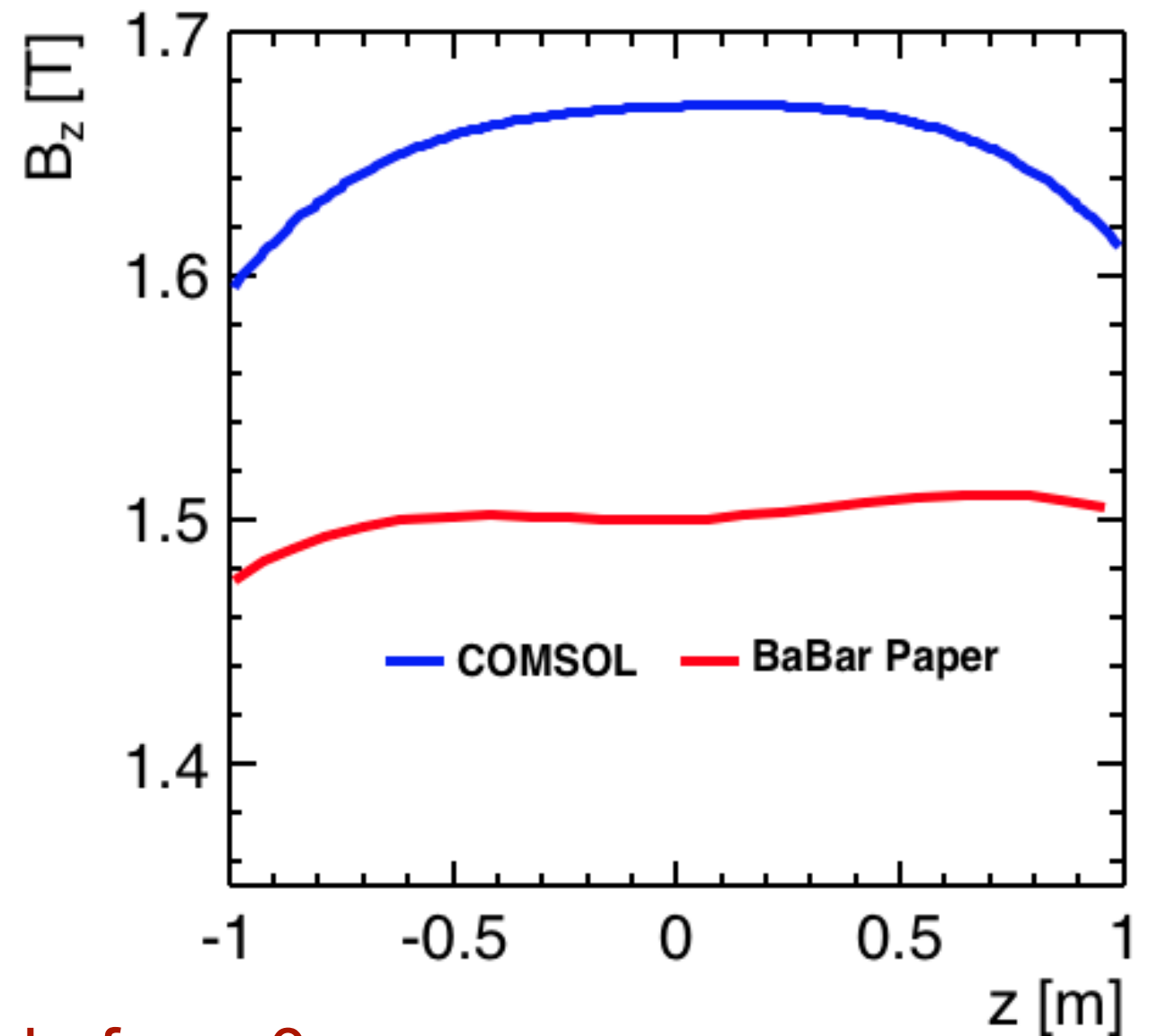
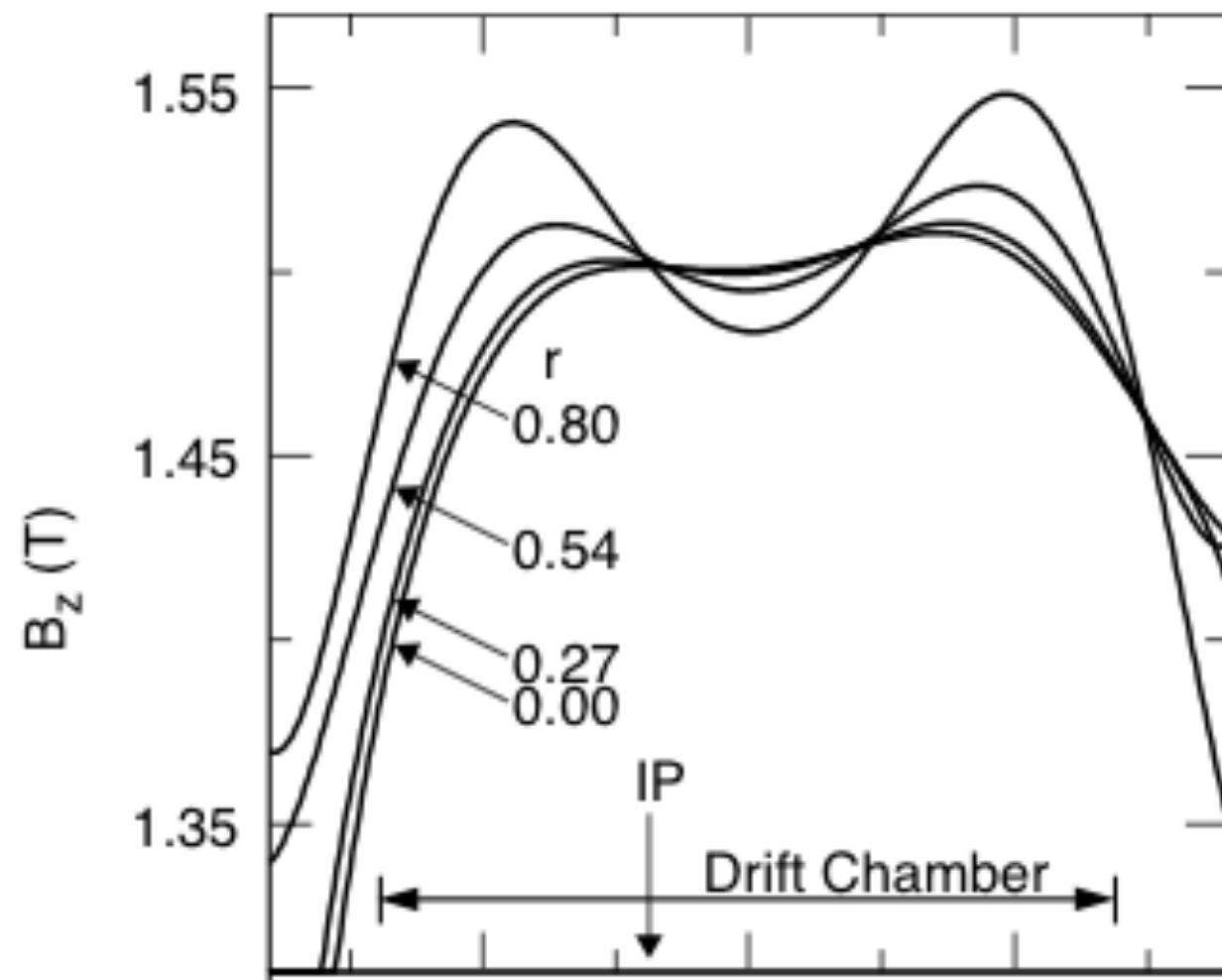


B [T]

BaBar quotes
~380 tf

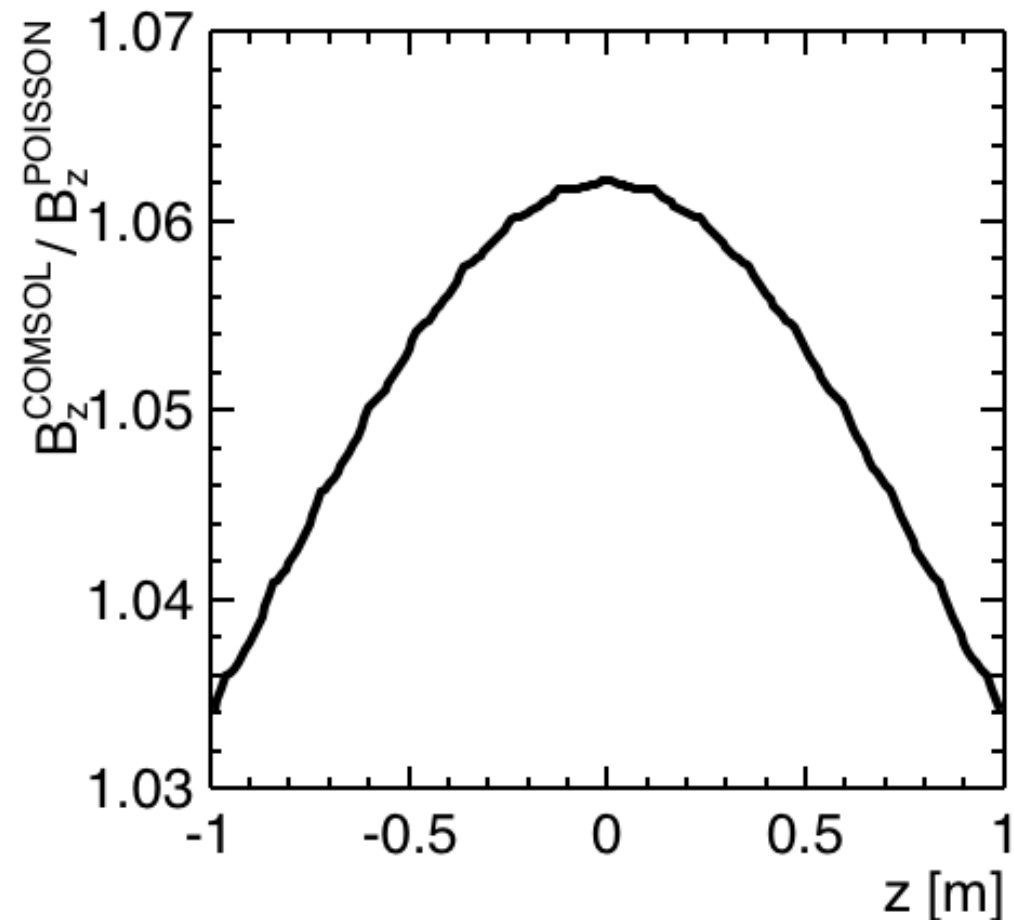
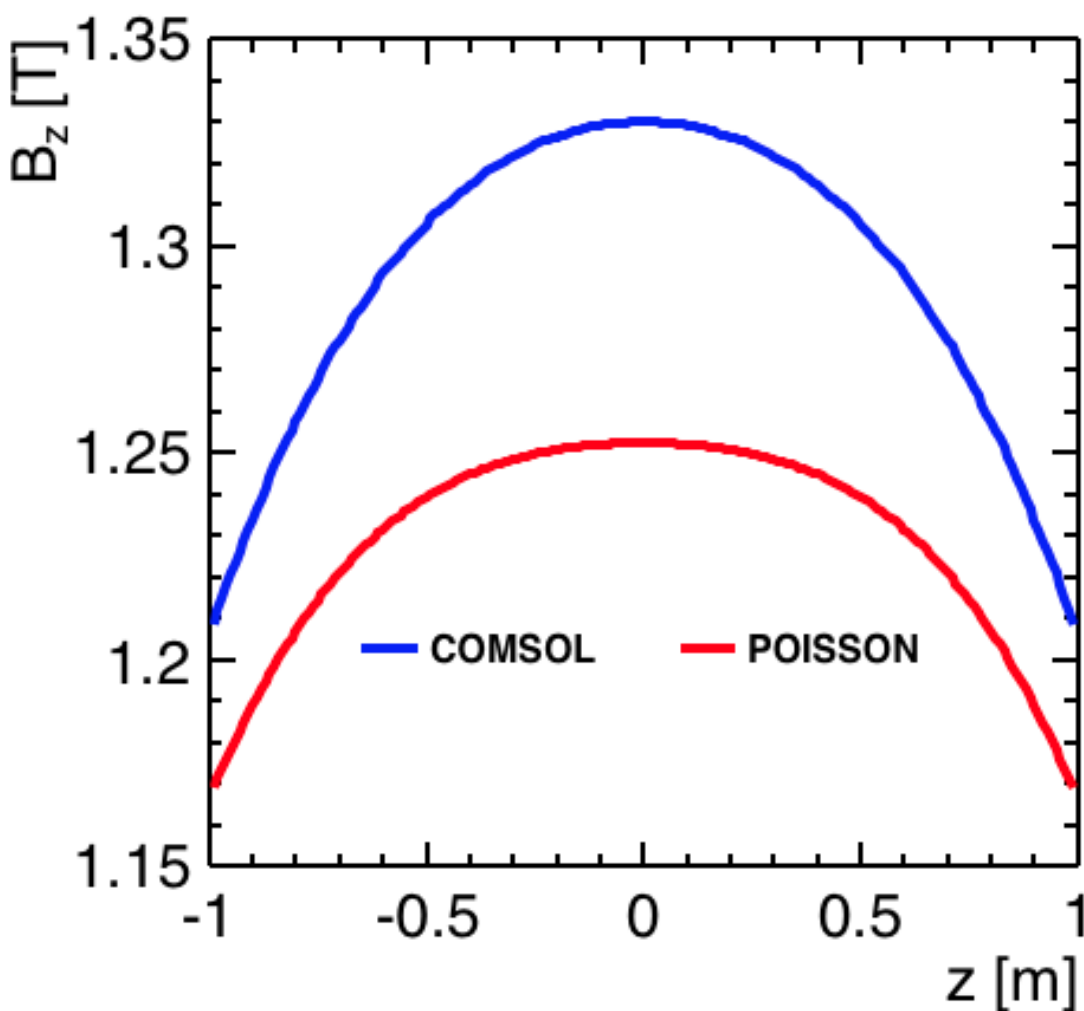


BaBar Field Map Crosscheck



Crosscheck made for $r=0$

COMSOL / POISSON Crosscheck Coil Only



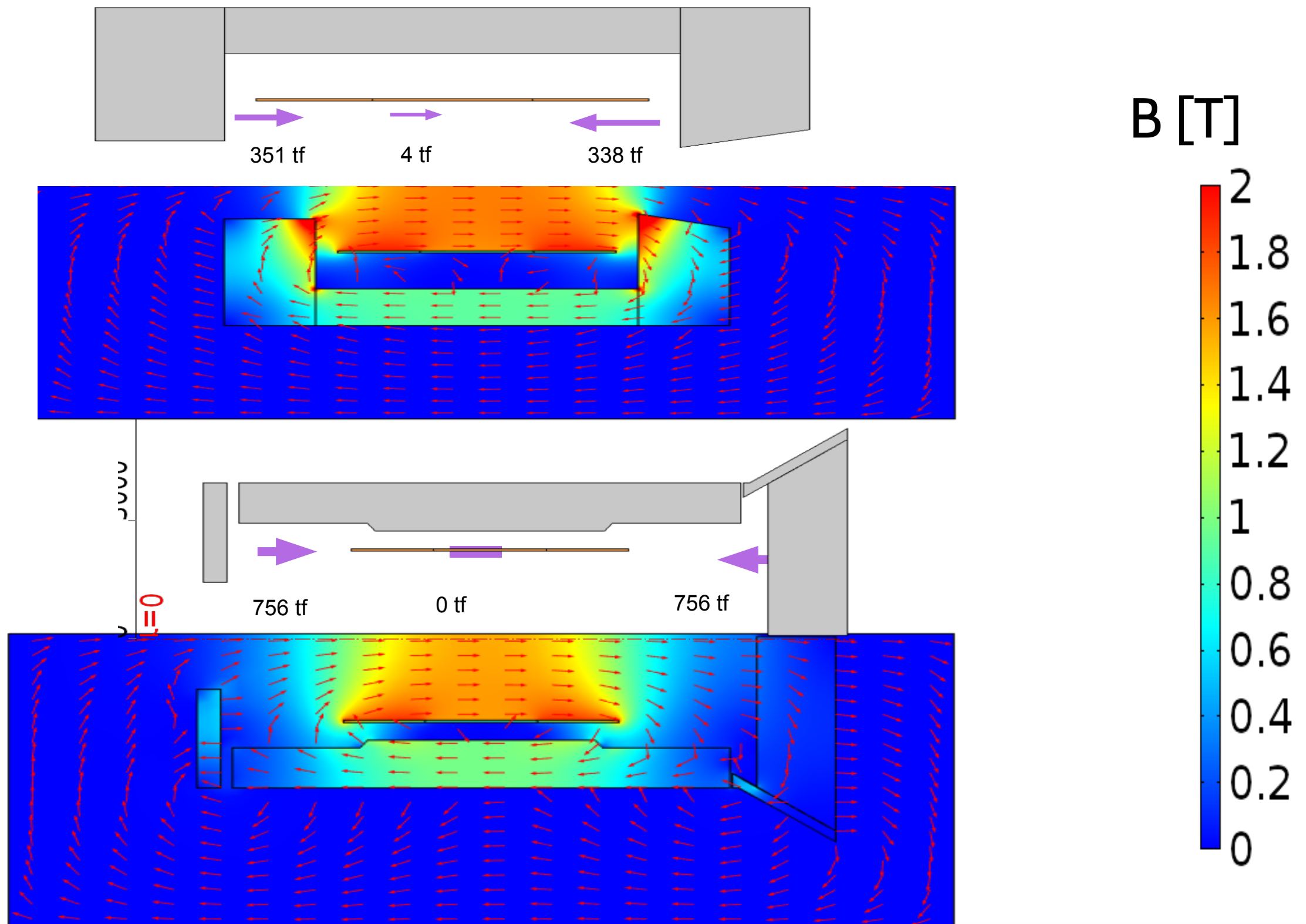
COMSOL data exported and analysed in ROOT.
Plot on the right shows ratios of B_z for COMSOL/POISSON
Difference in iterative techniques?

Summary

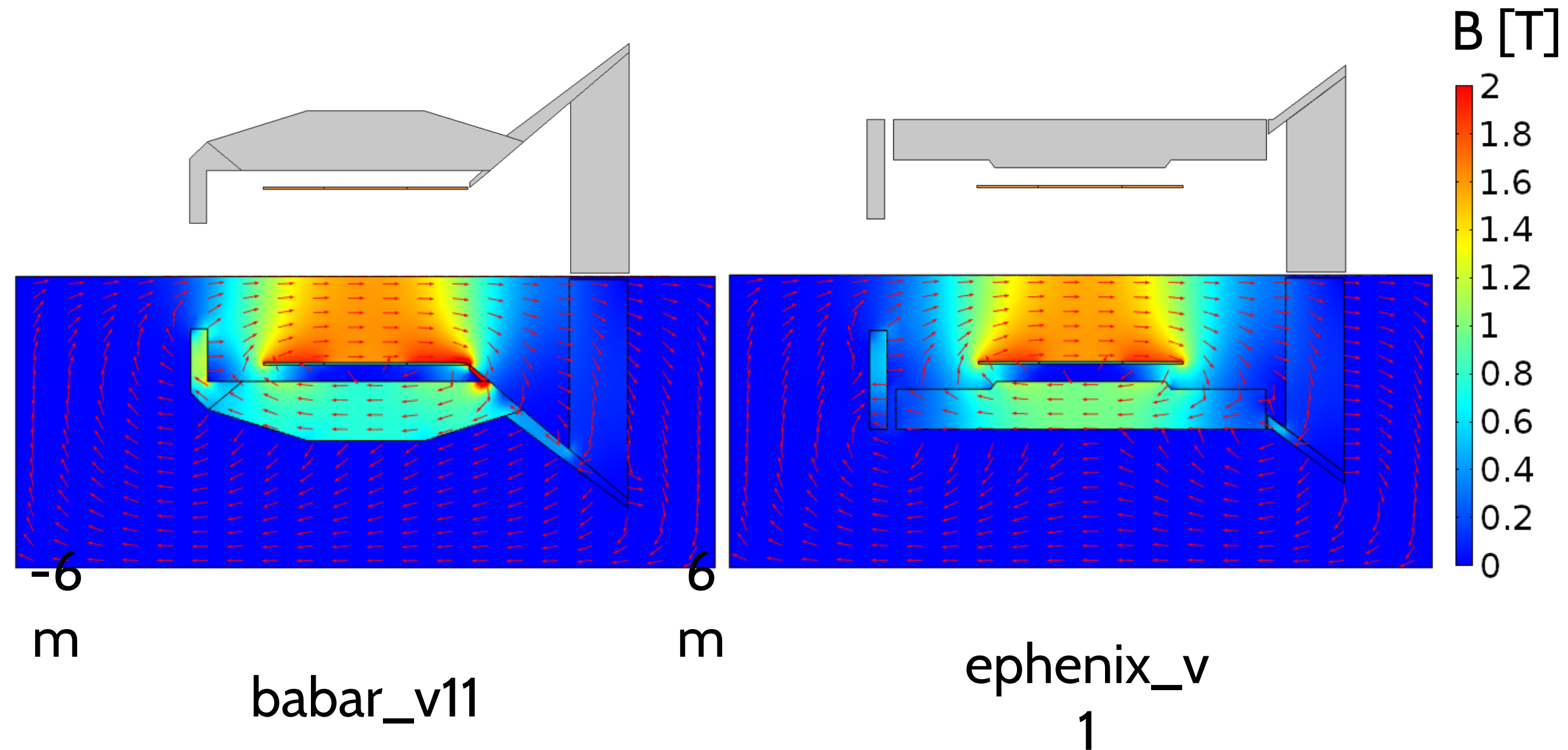
- COMSOL shows roughly 10% higher field strengths than POISSON
- HIPERCO50 - trouble defining material properties for the piston in COMSOL.
- Mesh refinement / convergence studies?

ADDITIONAL SLIDES

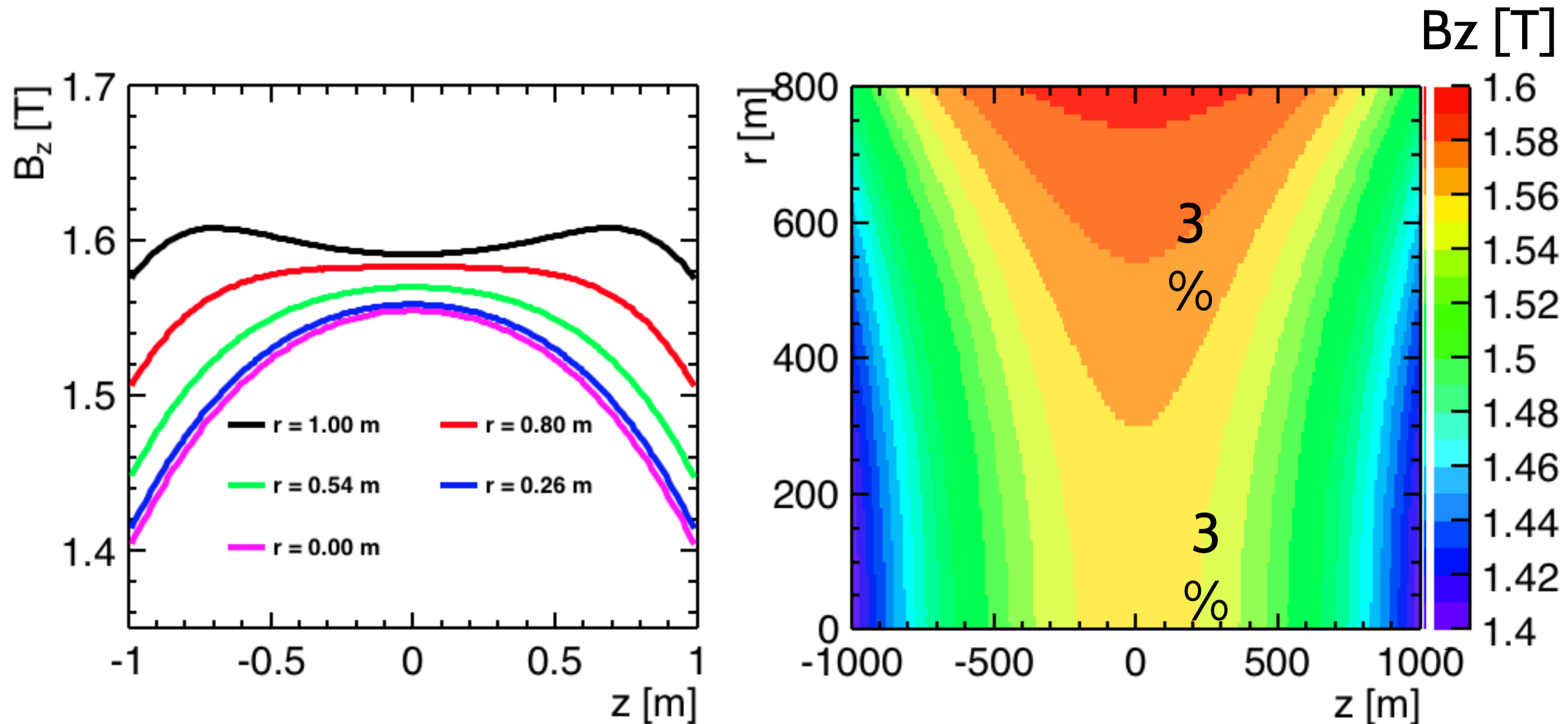
EIC Magnetic field in COMSOL



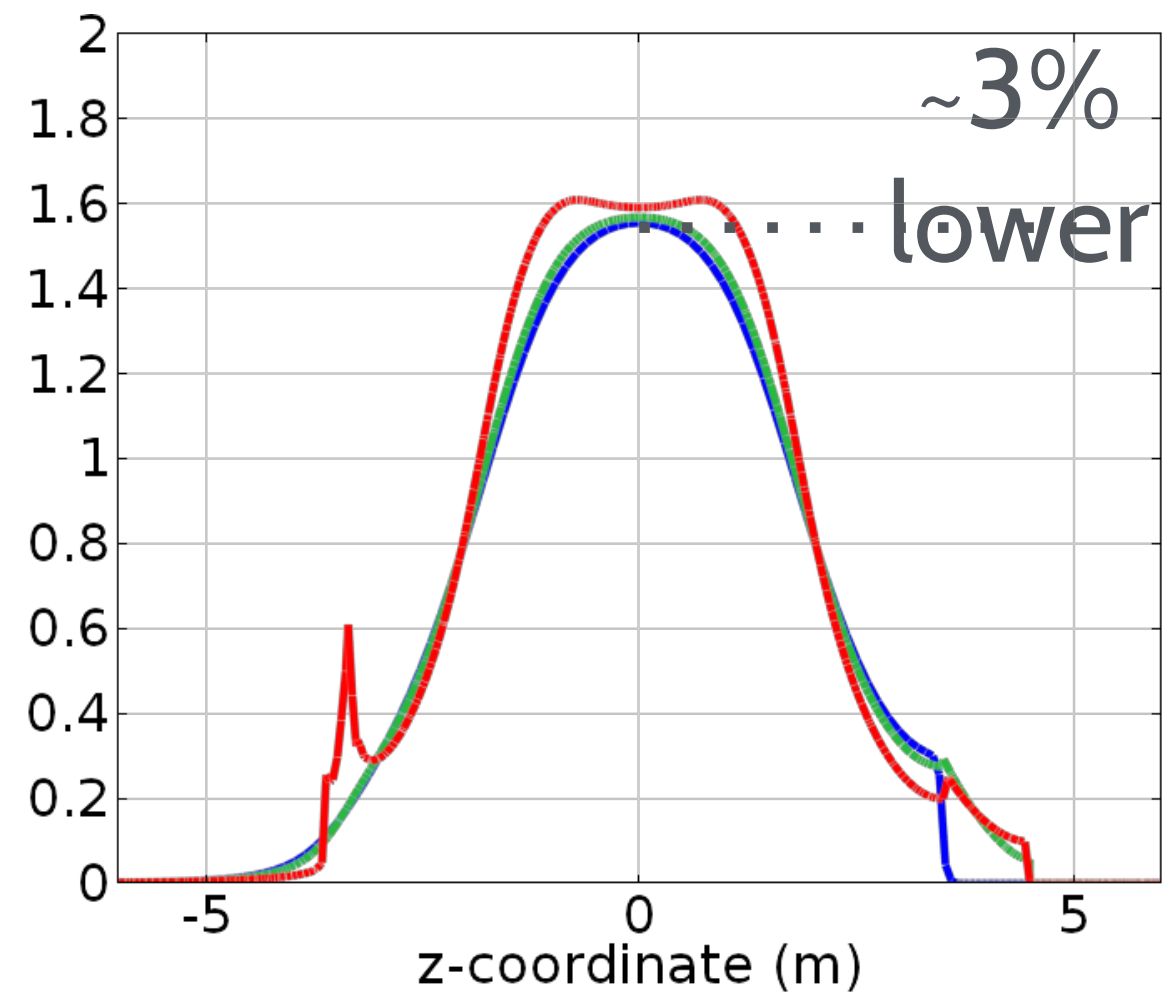
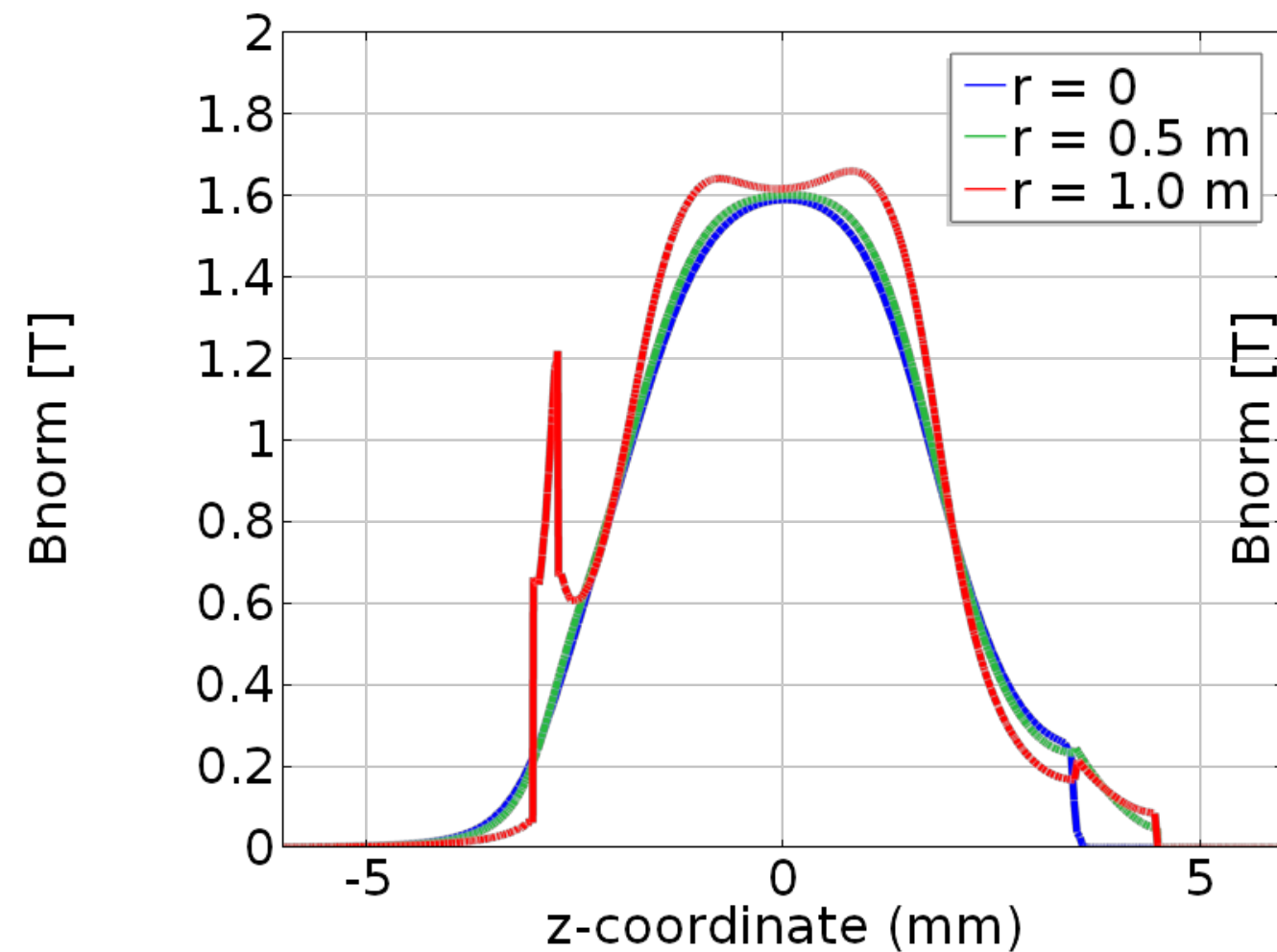
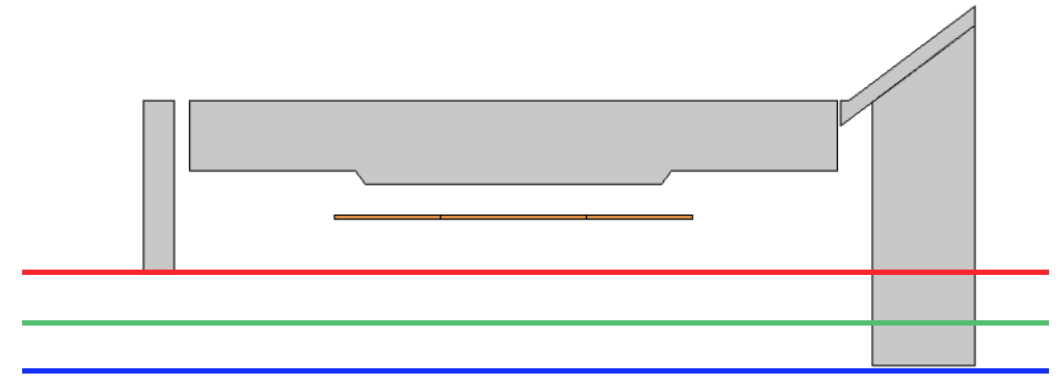
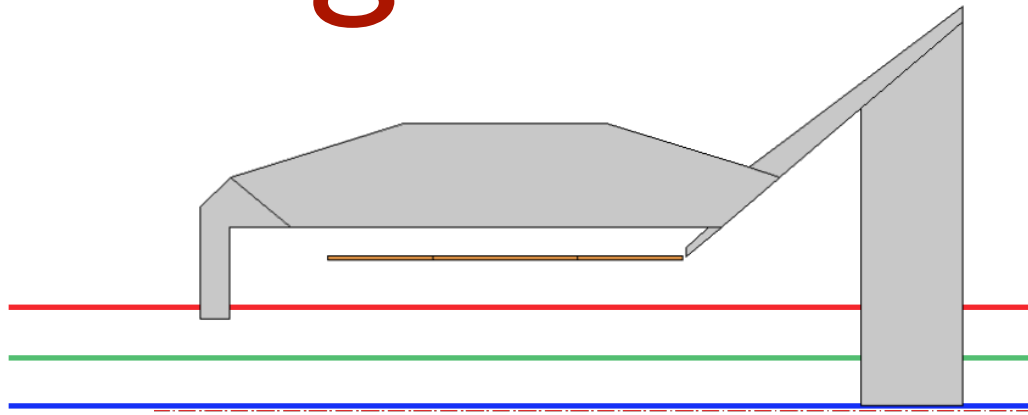
Magnetic field in COMSOL



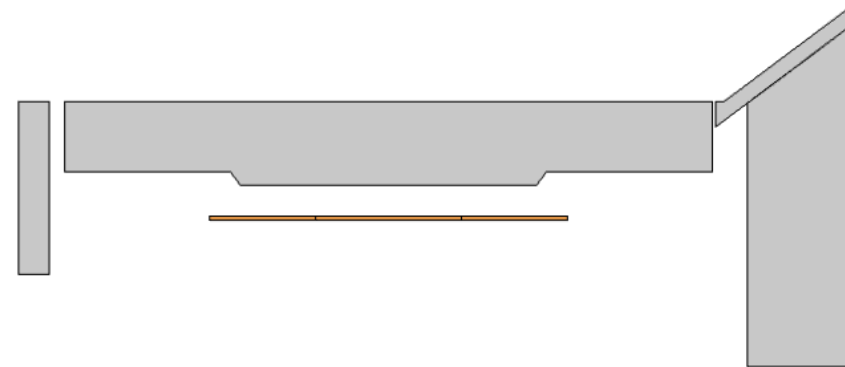
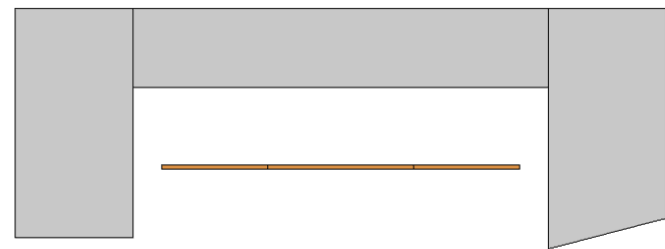
Magnetic field in TPC Region



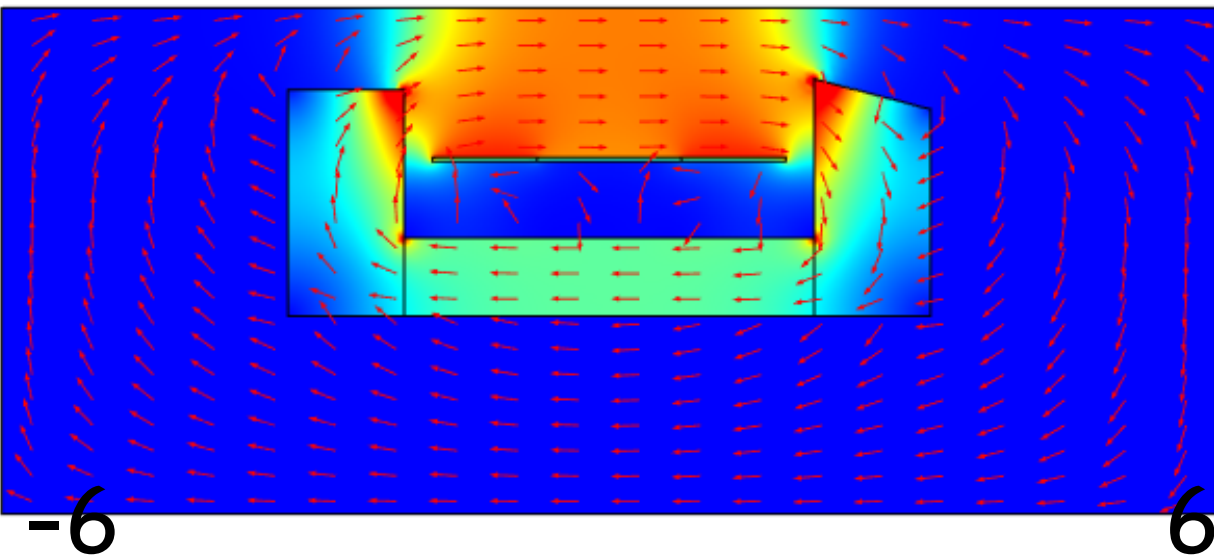
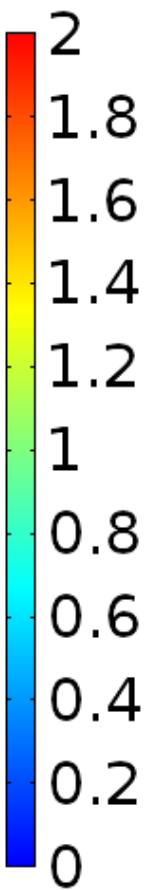
Magnetic field comparison



Magnetic field in COMSOL



B [T]



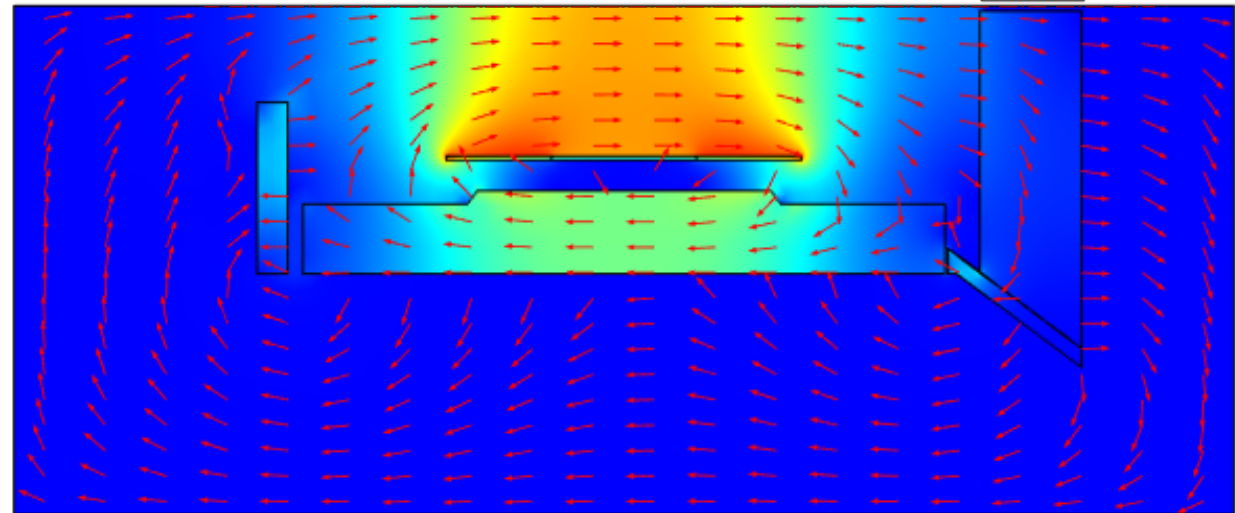
-6

6

m

babar_original_v1_2

D



ephenix_v

1

Magnetic field comparison

